No. 200300132

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Virginia Tech Intellectual Properties, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSE , OR USING IT IN UCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY CTION ACT. IN THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A ERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS SPECIFIED BY THE OWNER OF THE 4 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

BARLEY

'Price'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of Washington, D.C. this sixteenth day of September, in the year two thousand three.*

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions*

Form Approved - OMB No. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE
(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF OWNER
Virginia Tech Intellectual Properties, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NAME
VA96-44-321

3. VARIETY NAME
Price

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
Virginia Tech Intellectual Properties, Inc.
1872 Pratt Drive, Suite 1625
Blacksburg, VA 24060

5. TELEPHONE *(include area code)*
540-951-9378

6. FAX *(include area code)*
540-951-5292

FOR OFFICIAL USE ONLY

PVPO NUMBER
200300132

FILING DATE
Feb. 5, 2003

7. IF THE OWNER NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.)*
Corporation

8. IF INCORPORATED, GIVE STATE OF INCORPORATION
Virginia

9. DATE OF INCORPORATION
June, 20, 1985

10. NAME AND ADDRESS OF OWNER REPRESENTATIVE(S) TO SERVE IN THIS APPLICATION. *(First person listed will receive all papers)*
Carl A. Griffey
Crop & Soil Environmental Sciences Department
334-A Smyth Hall
Virginia Tech
Blacksburg, VA 24061-0404

FEES RECEIVED
FILING AND EXAMINATION FEES:
$ 2705.00
DATE 2/3/2003
CERTIFICATION FEE:
$ 432.00
DATE 6/11/2003

11. TELEPHONE *(Include area code)*
540-231-9789

12. FAX *(Include area code)*
540-231-3431

13. E-MAIL
cgriffey@vt.edu

14. CROP KIND *(Common Name)*
Winter Feed Barley

15. GENUS AND SPECIES NAME OF CROP
Hordeum vulgare

16. FAMILY NAME *(Botanical)*
Gramineae

17. IS THE VARIETY A FIRST GENERATION HYBRID?
☐ YES ☑ NO

18. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow instructions on reverse)
- a. ☑ Exhibit A. Origin and Breeding History of the Variety
- b. ☑ Exhibit B. Statement of Distinctness
- c. ☑ Exhibit C. Objective Description of Variety
- d. ☑ Exhibit D. Additional Description of the Variety *(Optional)*
- e. ☑ Exhibit E. Statement of the Basis of the Owner's Ownership
- f. ☑ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties, verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☑ Filing and Examination Fee ($2,705), made payable to "Treasurer of the United States" *(Mail to the Plant Variety Protection Office)*

19. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE SOLD AS A CLASS OF CERTIFIED SEED? *See Section 83(a) of the Plant Variety Protection Act)*
☑ YES *(If "yes", answer items 20 and 21 below)* ☐ NO *(If "no", go to item 22)*

20. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF CLASSES? ☑ YES ☐ NO
IF YES, WHICH CLASSES? ☑ FOUNDATION ☑ REGISTERED ☑ CERTIFIED

21. DOES THE OWNER SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS? ☐ YES ☑ NO
IF YES, SPECIFY THE NUMBER 1,2,3, etc. FOR EACH CLASS.
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED
(If additional explanation is necessary, please use the space indicated on the reverse.)

22. HAS THE VARIETY (INCLUDING ANY HARVESTED MATERIAL) OR A HYBRID PRODUCED FROM THIS VARIETY BEEN SOLD, DISPOSED OF, TRANSFERRED, OR USED IN THE U. S. OR OTHER COUNTRIES?
☑ YES ☐ NO
IF YES, YOU MUST PROVIDE THE DATE OF FIRST SALE, DISPOSITION, TRANSFER, OR USE FOR EACH COUNTRY AND THE CIRCUMSTANCES. *(Please use space indicated on reverse.)*

23. IS THE VARIETY OR ANY COMPONENT OF THE VARIETY PROTECTED BY INTELLECTUAL PROPERTY RIGHT *(PLANT BREEDER'S RIGHT OR PATENT)*?
☐ YES ☑ NO
IF YES, PLEASE GIVE COUNTRY, DATE OF FILING OR ISSUANCE AND ASSIGNED REFERENCE NUMBER. *(Please use space indicated on reverse.)*

24. The owners declare that a viable sample of basic seed of the variety has been furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned owner(s) is(are) the owner of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Owner(s) is(are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF OWNER	SIGNATURE OF OWNER
Michael J. Martin	
NAME *(Please print or type)* Michael J. Martin	NAME *(Please print or type)*
CAPACITY OR TITLE Executive Vice President	DATE 1/31/03
CAPACITY OR TITLE	DATE

INSTRUCTIONS

200300132

GENERAL: To be effectively filed with the Plant Variety Protection Office (PVPO), **ALL** of the following items must be **received** in the PVPO: (1) Completed application form signed by the owner; (2) completed exhibits A, B, C, E; (3) for a seed reproduced variety at least 2,500 viable untreated seeds, for a hybrid variety at least 2,500 untreated seeds of each line necessary to **reproduce** the variety, or for tuber reproduced varieties verification that a viable *(in the sense that it will reproduce an entire plant)* tissue culture will be deposited and maintained in an approved public repository; (4) check drawn on a U.S. bank for $2,705 ($320 filing fee and $2,385 examination fee), payable to "Treasurer of the United States" *(See Section 97.6 of the Regulations and Rules of Practice.)* Partial applications will be held in the PVPO for not more than 90 days, then returned to the applicant as unfiled. Mail application and other requirements to Plant Variety Protection Office, AMS, USDA, Room 401, NAL Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351. Retain one copy for your files. All items on the face of the application are self explanatory unless noted below. Corrections on the application form and exhibits must be initialed and dated. **DO NOT** use masking materials to make corrections. If a certificate is allowed, you will be requested to send a check payable to "Treasurer of the United States" in the amount of $320 for issuance of the certificate. Certificates will be issued to owner, not licensee or agent.

Plant Variety Protection Office
Telephone: (301) 504-5518
FAX: (301) 504-5291
Homepage: http://www.ams.usda.gov/science/pvpo/pvp.htm

ITEM

18a. Give:
(1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding method;
(2) the details of subsequent stages of selection and multiplication;
(3) evidence of uniformity and stability; and
(4) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified

18b. Give a summary of the variety's distinctness. Clearly state how this application variety may be distinguished from all other varieties in the same crop. If the new variety is most similar to one variety or a group of related varieties:

(1) identify these varieties and state all differences objectively;
(2) attach statistical data for characters expressed numerically and demonstrate that these are clear differences; and
(3) submit, if helpful, seed and plant specimens or photographs (prints) of seed and plant comparisons which clearly indicate distinctness.

18c. Exhibit C forms are available from the PVPO Office for most crops; specify crop kind. Fill in Exhibit C (Objective Description of Variety) form as completely as possible to describe your variety.

18d. Optional additional characteristics and/or photographs. Describe any additional characteristics that cannot be accurately conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, *etc.*

18e. Section 52(5) of the Act requires applicants to furnish a statement of the basis of the applicant's ownership. An Exhibit E form is available from the PVPO.

19. If "Yes" is specified *(seed of this variety be sold by variety name only, as a class of certified seed)*, the applicant **MAY NOT** reverse this affirmative decision after the variety has been sold and so labeled, the decision published, or the certificate issued. However, if "No" has been specified, the applicant may change the choice. *(See Regulations and Rules of Practice, Section 97.103).*

22. *See Sections 41, 42, and 43 of the Act and Section 97.5 of the regulations for eligibility requirements.*

23. *See Section 55 of the Act for instructions on claiming the benefit of an earlier filing date.*

21. CONTINUED FROM FRONT *(Please provide a statement as to the limitation and sequence of generations that may be certified.)*

22. CONTINUED FROM FRONT *(Please provide the date of first sale, disposition, transfer, or use for each country and the circumstances, if the variety (including any harvested material) or a hybrid produced from this variety has been sold, disposed of, transferred, or used in the U.S. or other countries.)*

Foundation seed of Price barley was first provided to seedsmen for multiplication in Fall 2002.

23. CONTINUED FROM FRONT *(Please give the country, date of filing or issuance, and assigned reference number, if the variety or any component of the variety is protected by intellectual property right (Plant Breeder's Right or Patent).)*

NOTES: It is the responsibility of the applicant/owner to keep the PVPO informed of any changes of address or change of ownership or assignment or owner's representative during the life of the application/certificate. There is no charge for filing a change of address. The fee for filing a change of ownership or assignment or any modification of owner's name is specified in Section 97.175 of the regulations. *(See Section 101 of the Act, and Sections 97.130, 97.131, 97.175(h) of the Regulations and Rules of Practice.)*

To avoid conflict with other variety names in use, the applicant must check the appropriate recognized authority. For example, for agricultural and vegetable crops, contact: Seed Branch, AMS, USDA, Room 213, Building 306, Beltsville Agricultural Research Center–East, Beltsville, MD 20705. Telephone: (301) 504-8089. http://www.ams.usda.gov/lsg/seed.htm

200300132

'PRICE' WINTER FEED BARLEY

18A. EXHIBIT A: ORIGIN AND BREEDING HISTORY

Price winter feed barley was derived from the cross 'Callao'/SC830366. The experimental line SC830366, derived from the cross 'McNair 601'/'Harrison'// 'Gembloux'/3/'Henry' and developed at Clemson University, was selected as a parent from the 1988-89 USDA-ARS Uniform Winter Barley Yield Nursery. The cross was made in spring1990, and the F_1 generation was grown in the field as a single 4ft headrow in 1991 to produce F_2 seed. The population was advanced from the F_2 to F_4 generation using a modified bulk breeding method.

POPULATION ADVANCEMENT AND SELECTION OF THE VARIETY

Barley spikes were selected from the population in each segregating generation (F_2-F_4) on the basis of absence of obvious disease, early maturity, short straw and desirable head type and size. Selected spikes were threshed in bulk, and the seed was planted in 225ft^2 blocks in the fall of each year. Spikes selected from the F_4 bulk where threshed individually and planted in separate 4ft headrows. Price was derived as a bulk of one of these F_5 headrows selected in 1995. The line was tested as entry 321 in non-replicated observation tests in 1996 and was designated VA96-44-321. This line was tested in Virginia's Official Variety Trials from 1997 to 2001 (Tables 1-6). It also was tested for three years (1998-2000) in the USDA-ARS Uniform Winter Barley Yield Nursery (Tables 7-12) and in the USDA-ARS Uniform Barley Winter Hardiness Nursery (Tables 13-15).

MULTIPLICATION AND PURIFICATION

Initial Breeder Seed of Price was developed in 2000-01 via removal of variant plants from a 0.25 acre F_{11} increase block planted at the VCIA Foundation Seed Farm. This increase block produced 30 bu of Breeder Seed, of which 22 bu were planted on 10 acres at VCIA Foundation Seed Farm in fall 2001. The field was scouted and variant plants were removed during the growing season. The field was harvested and produced 1100 bu of Price Foundation Seed. A portion of this seed was planted on 16 acres at the Foundation Seed Farm in fall 2002, and the remaining seed was provided to seedsmen for multiplication. While Price has remained stable and uniform in composition through the last two generations of multiplication, the initial Breeder Seed contained the following proportion of variants: up to 0.1% taller plants, 0.1% plants having no awns or short awnlets, and 0.1% plants having long awns.

Development of a purer source of Price Breeder Seed was initiated in fall 2002. During fall 2002, 400 headrows of Price, each originating from a single spike, were planted and will be evaluated in 2003 for purity and trueness of type. Variant headrows will be removed prior to harvest, and the remaining rows will be harvested and advanced to form a purer source of Breeder seed.

'PRICE' WINTER FEED BARLEY

18B. EXHIBIT B: NOVELTY STATEMENT

Price is uniquely different from all know barley cultivars, but is most similar to its parent Callao. On the basis of disease reaction (0=immune to 4=highly susceptible) of seedlings in greenhouse tests conducted from 1997-2000, Price is highly resistant (infection type = 0;N) to leaf rust (*Puccinia hordei*) race 8, while Callao is moderately susceptible (IT=23). Conversely, seedlings of Price are moderately susceptible (IT=3,4) to powdery mildew (*Blumeria graminis* f. sp. *hordei*), while those of Callao are highly resistant (IT=0). On average, head emergence of Price is 3.3 days (range 2-5 days) later than Callao (See table below). Average plant height of Price is 1.9 inches (range 1-3 inches) taller than Callao. Straw strength of Price is better than that of Callao on the basis of lodging scores (0.2=no lodging to 10=complete lodging). Average lodging score of Price (1.4) was lower than that of Callao (5.9) with differences ranging from 3.4 to 5.6 over the five year period.

Price versus Callao for Heading Date, Plant Height and Lodging

	Price	Callao	Difference	L.S.D. (0.05)
5-Year Mean(1997-2001)				
Heading Date (Mar 31+)	20.6	17.3	3.3*	0.4
Plant Height (inches)	35.6	33.7	1.9*	0.5
Lodging (0.2 – 10)	1.4	5.9	4.5*	0.5
1996-1997 Season				
Heading Date (Mar 31+)	23	20	3*	1.0
Plant Height (inches)	37	36	1*	1.0
Lodging (0.2 – 10)	1.2	5.0	3.8*	1.1
1997-1998 Season				
Heading Date (Mar 31+)	18	15	3*	1.0
Plant Height (inches)	36	33	3*	1.0
Lodging (0.2 – 10)	2.8	7.6	4.8*	1.2
1998-1999 Season				
Heading Date (Mar 31+)	22	19	3*	1.0
Plant Height (inches)	37	35	2*	1.0
Lodging (0.2 – 10)	0.3	4.0	3.7*	0.6
1999-2000 Season				
Heading Date (Mar 31+)	17	15	2*	1.0
Plant Height (inches)	37	35	2*	1.0
Lodging (0.2 – 10)	1.0	4.4	3.4*	0.8
2000-2001 Season				
Heading Date (Mar 31+)	25	20	5*	1.0
Plant Height (inches)	31	30	1*	1.0
Lodging (0.2 – 10)	2.1	7.7	5.6*	1.1

FORM APPROVED: OMB NO. 40-R3822

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Barley)

OBJECTIVE DESCRIPTION OF VARIETY
BARLEY (*HORDEUM VULGARE*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S)
Virginia Tech Intellectual Properties, Inc.

ADDRESS (*Street and No. or R.F.D. No., City, State, and ZIP Code*)
1872 Pratt Drive, Suite 1625
Blacksburg, VA 24060

FOR OFFICIAL USE ONLY
PVPO NUMBER
200300132

VARIETY NAME OR TEMPORARY DESIGNATION
Price

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (i.e. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. GROWTH HABIT:

[3] 1 = SPRING 2 = FACULTATIVE WINTER 3 = WINTER

[2] Early Growth: 1 = PROSTRATE 2 = SEMIPROSTRATE 3 = ERECT

2. MATURITY (50% Flowering):

[2] 1 = EARLY (California Mariout) 2 = MIDSEASON (Betzes) 3 = LATE (Frontier)

[2] No. of days *Earlier* than ..... [8]
[3] No. of days *Later* than ..... [9]

1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8=Wysor 9=Callao

3. PLANT HEIGHT (From soil level to top of head):

[2] 1 = SEMIDWARF 2 = SHORT (California Mariout) 3 = MEDIUM TALL (Betzes) 4 = TALL (Conquest)

[1][4] Cm. *Shorter* than ..... [8]
[ ][5] Cm. *Taller* than ..... [9]

1 = BETZES 2 = CALIFORNIA MARIOUT 3 = CONQUEST 4 = DICKSON 5 = PIROLINE 6 = PRIMUS 7 = UNITAN 8=Wysor 9=Callao

4. STEM:

[2] Exertion (*Flag to spike at maturity*): 1 = 0 - 3 cm. 2 = 3 - 10 cm. 3 = 10 - 15 cm.

[1] Anthocyanin: 1 = ABSENT 2 = PRESENT

[0][5] NO. OF NODES (Originating from node above ground)

[1-2] Collar Shape: 1 = CLOSED 2 = V-SHAPED 3 = OPEN 4 = MODIFIED CLOSED OR OPEN

[1] Shape of Neck: 1 = STRAIGHT 2 = SNAKY 3 = OTHER (Specify) _____

5. LEAF:

[1] Basal leaf sheath (*seedling*): 1 = GLABROUS 2 = PUBESCENT

[2] Position of flag leaf (*at boot stage*): 1 = DROOPING 2 = UPRIGHT

[1] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY Leaf sheath is waxy

[2][0] MM. WIDTH (First leaf below flag leaf)

[1][5] CM. LENGTH (First leaf below flag leaf)

[1] Anthocyanin in leaf sheath: 1 = ABSENT 2 = PRESENT

6. HEAD:

[2] Type: 1 = TWO-ROWED 2 = SIX-ROWED

[3] Density: 1 = LAX 2 = ERECT (Not dense) 3 = ERECT (Dense)

[4] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER (Specify) Strap & Parallel

[2] Waxiness: 1 = ABSENT (Glossy) 2 = SLIGHTLY WAXY 3 = WAXY

[3] Lateral Kernels Overlap: 1 = NONE 2 = AT TIP 3 = 1/4 - 1/2 OF HEAD

[3] Rachis (*Hair on edge*): 1 = LACKING 2 = FEW 3 = COVERED

7. GLUME:

[1] Length: 1 = 1/3 OF LEMMA 2 = 1/2 OF LEMMA 3 = MORE THAN 1/2 OF LEMMA

[3] Hairs: 1 = NONE 2 = SHORT 3 = LONG

[4] Hair covering: 1 = NONE 2 = RESTRICTED TO MIDDLE 3 = CONFINED TO BAND 4 = COMPLETELY COVERED

[2] Awns: 1 = LESS THAN EQUAL TO LENGTH OF GLUMES 2 = EQUAL TO LENGTH OF GLUMES 3 = MORE THAN EQUAL TO LENGTH OF GLUMES

[3] Awn Surface: 1 = SMOOTH 2 = SEMISMOOTH 3 = ROUGH

200300132

8. LEMMA:

[4] Awn: 1 = AWNLESS 2 = AWNLETS ON CENTRAL ROWS, AWNLESS ON LATERAL ROWS 3 = SHORT ON CENTRAL ROWS, AWNLETS ON LATERAL ROWS 4 = SHORT (less than equal to length of spike) 5 = LONG (longer than spike) 6 = HOODED

[4] Awn Surface: 1 = AWNLESS 2 = SMOOTH 3 = SEMISMOOTH 4 = ROUGH

[2] Teeth: 1 = ABSENT 2 = FEW 3 = NUMEROUS

[2] Hair: 1 = ABSENT 2 = PRESENT

[1] Shape of base: 1 = DEPRESSION 2 = SLIGHT CREASE 3 = TRANSVERSE CREASE

[2] Rachilla Hairs: 1 = SHORT 2 = LONG

9. STIGMA:

[ ] Hairs: 1 = FEW 2 = MANY

10. SEED:

[2] Type: 1 = NAKED 2 = COVERED

[1] Hairs on Ventral Furrow: 1 = ABSENT 2 = PRESENT

[2] Length: 1 = SHORT (8.0 mm.) 2 = SHORT TO MIDLONG (7.5 - 9.0 mm.) 3 = MIDLONG (8.5 - 9.5 mm.) 4 = MIDLONG TO LONG (9.0 - 10.5 mm.) 5 = LONG (10.0 mm.)

[3] Wrinkling of hull: 1 = NAKED 2 = SLIGHTLY WRINKLED 3 = SEMIWRINKLED 4 = WRINKLED

[1] Aleurone Color: 1 = COLORLESS (White or Yellow) 2 = BLUE

[ ][ ] PERCENT ABORTIVE

[3][2] GMS. PER 1000 SEEDS

11. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SEPTORIA	[1] NET BLOTCH	[2] SPOT BLOTCH	[2] POWDERY MILDEW
[0] LOOSE SMUT	[0] BACTERIAL BLIGHT	[0] COVERED SMUT	[0] FALSE LOOSE SMUT
[0] STEM RUST	[2] LEAF RUST	[1] SCAB	[2] SCALD
[0] AY	[0] BSMV	[2] BYDV	[ ] OTHER (Specify)

12. INSECT: (0 = Not tested, 1 = Susceptible, 2 = Resistant)

[0] GREEN BUG	[0] ENGLISH GRAIN APHID	[0] CHINCH BUG	[0] ARMYWORM
[0] GRASS HOPPERS	[1] CERIAL LEAF BETTLE	[ ] OTHER (Specify) _____	

HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

13. CHEMICAL (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] DDT [ ] OTHER (Specify) _____

14. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Callao	Seed size	Callao
Leaf size	Callao	Coleoptile elongation	
Leaf color	Callao	Seedling pigmentation	
Leaf carriage	Callao		

REFERENCES: The following publications may be used as a reference aid for the standardization of character descriptions and terms used in this form:

1. Wiebe, G. A., and D. A. Reid, 1961, Classification of Barley Varieties Grown in the United States and Canada in 1958, Technical Bulletin No. 1224, U.S. Dept. of Agriculture.
2. Reid, D. A., and G. A. Wiebe, 1968, Barley: Origin, Botany, Culture, Winter Hardiness, Genetics, Utilization, Pests, Agriculture Handbook No. 338, U.S. Dept. of Agriculture. pp. 61 - 84.
3. Malting Barley Improvement Association, Milwaukee, Wisconsin, 1971, Barley Variety Dictionary.

COLOR: Nickerson's or any recognized color fan may be used to determine color of the described variety.

'PRICE' WINTER FEED BARLEY

18D. EXHIBIT D: ADDITIONAL DESCRIPTION OF PRICE

Since Price has not been tested in comparison with any of the seven cultivars listed in Exhibit C, performance data are presented in Tables 1-15. Price is a high yielding, moderately-early maturing, short awned, six-row winter-feed barley with very good straw strength and test weight. On average, head emergence of Price is 1-2 days later than 'Nomini', 3 days later than Callao, and 2 days earlier than 'Wysor' (Tables 1,8,10,12). The average plant height of Price (36 inches) is 2 inches taller than Callao, 4.5 inches shorter than Wysor and 5.5 inches shorter than Nomini. Straw strength (0=no lodging, 10=completely lodged) of Price (1.4) is excellent in comparison with Nomini (1.8), Wysor (2.0), and Callao (5.9). Average grain yields of Price (114.4 Bu/ac) in Virginia have been similar to those of Nomini and Callao (Table 1). In the Uniform Winter Barley Yield Nurseries (1998-99 and 1999-2000), average grain yields of Price (102 Bu/ac) were similar to those of Nomini, and 3.5 Bu/ac higher than those of Callao (Tables 8, 10). Over all locations (11-12 each year), Price ranked 2nd among 20 entries in 1998, 1st among 18 entries in 1999 and 9th among 25 entries in 2000. Average test weight of Price (50.3 LB/Bu) in Virginia has been only slightly lower (0.7 LB/Bu) than that of Callao, but has been significantly higher than those of Wysor (48.5 LB/Bu) and Nomini (47.5 LB/Bu). In the 1998-99 and 1999-2000 uniform nurseries, average test weight of Price (47.4 LB/Bu) was 0.5 LB/Bu lower than that of Callao, but nearly 3 LB/Bu higher than those of Wysor and Nomini. Price has expressed good winter-hardiness (92% survival) in comparison with Wysor (95%), a very winter-hardy cultivar (Tables 10, 12). In the 1998-2000 Uniform Barley Winter Hardiness Nursery, Price had a mean survival score of 72%, compared with 63% for 'Tennessee Winter', 82% for 'Kentucky 1', and 45% for the winter-tender check 'Trebi' (Tables 13-15).

In adult plant stages, Price is resistant to powdery mildew (*Blumeria graminis* f. sp. *hordei*) and barley yellow dwarf (Tables 2-6, 8, 10). It is moderately resistant to leaf rust (*Puccinia hordei*) and scald (*Rhynchosporium secalis*). It is moderately susceptible to net blotch (*Pyrenophora teres*).

200300132

Table 1. Five-year summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 1997 - 2001 harvests.*

Line	Yield (Bu/acre) (23)		Test Weight (Lb/bu) (22)		Date Headed (Mar. 31+) (18)		Height (In) (16)		Lodging♥ (0.2-10) (21)	
VA96-44-321	**114.4**		**50.3**	**+**	**20.6**		**35.6**	**-**	**1.4**	**-**
CALLAO	114.3		51.0	+	17.3	-	33.7	-	5.9	+
NOMINI	114.2		47.5	-	18.8	-	41.7	+	1.5	-
STARLING	114.1		47.4	-	22.2	+	40.3	+	2.5	
WYSOR	107.4	-	48.5	-	22.4	+	41.3	+	2.6	
Test Average (n=5)	112.9		49.0		20.3		38.5		2.8	
L.S.D. (0.05)	2.9		0.3		0.4		0.5		0.5	
C.V.	8.4		2.0		6.1		3.8		62.2	

* A plus or minus sign indicates a performance significantly above or below the test average.
The number in parentheses below column headings indicates the number of location-years on which data are based.
♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is barley standing upright and 5 is barley totally flat.

Table 2. Summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 2001 harvest.*

Line	Yield (Bu/acre) (5)	Test Weight (Lb/bu) (4)	Date Headed (Mar. 31+) (4)	Height (In) (3)	Lodging♥ (0.2-10) (4)	Leaf Rust (0-9)♦ (1)	Spring Freeze Damage (1)
VA96-44-321	110 +	50.2 -	25 +	31 -	2.1	4 +	4
CALLAO	104	50.1 -	20 -	30 -	7.7 +	3	5 +
NOMINI	106	47.7 -	23 -	38 +	1.8 -	4 +	2 -
STARLING	103	47.8 -	24	36 +	5.3 +	3	4
WYSOR	98	48.0 -	25 +	37 +	4.6 +	8 +	3 -
Test Average (n=41)	101	52.2	24	33	3.1	3	4
L.S.D. (0.05)	7	0.6	1	1	1.1	1	1
C.V.	10	1.6	8	3	50.5	23	13

* A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of locations on which data are based.

♥ Belgian Lodging Scale = Area x Intensity x 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity = 1-5, where 1 is barley standing upright and 5 is barley totally flat.

♦ The 0-9 ratings indicate degree to which plant is affected, where 0 = none and 9 = total plant is affected.

Table 3. Summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 2000 harvest*.

Brand/Variety	Yield (Bu/A) (4)	Test Weight (Lb) (4)	Date Headed (Mar. 31+) (4)	Height (In) (3)	Lodging✣ (0.2-10) (5)	Leaf Rust (0-9)◇ (2)	Powdery Mildew (0-9)◇ (2)
VA96-44-321	**116**	**51.4 +**	**17**	**37**	**1.0 -**	**5**	**0**
CALLAO	115	52.0 +	15 -	35 -	4.4 +	5	0
NOMINI	130 +	47.6 -	16 -	43 +	1.0 -	5	0
STARLING	121	47.4 -	20 +	42 +	1.3	4 -	1
WYSOR	112	48.9 -	20 +	43 +	1.8	7 +	0
Test Average (n=31)	114	50.6	17	37	1.9	5	1
L.S.D. (0.05)	8	0.7	1	1	0.8	1	1
C.V.	10	1.9	5	3	---	---	---

* A plus or minus sign indicates a performance significantly above or below the test average. The number in parentheses below column headings indicates the number of locations on which data are based.

✣ Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is barley unaffected and 10 is entire plot affected and Intensity=1-5, where 1 is barley standing upright and 5 is barley lying totally flat.

◇The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 4. Summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 1999 harvest.*

Brand/Variety	Yield (Bu/A) (4)	Test Weight (Lb) (4)	Date Headed (Mar. 31+) (3)	Height (In) (3)	Lodging✣ (0.2-10) (4)	Powdery Mildew (0-9)◇ (1)	Leaf Rust (0-9)◇ (1)
VA96-44-321	**133 +**	**50.3**	**22 +**	**37**	**0.3 -**	**1**	**5**
STARLING	129	47.9 -	24 +	40 +	0.9	1	3 -
WYSOR	128	48.8 -	24 +	42 +	0.9	1	9 +
NOMINI	127	47.6 -	21 +	43 +	0.6	1	7 +
CALLAO	125	51.2 +	19 -	35 -	4.0 +	1	6 +
Test Average (n=26)	127	50.1	20	37	0.9	1	5
L.S.D. (0.05)	6	0.5	1	1	0.6	1	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates performance significantly above or below the test average, respectively.

✣ Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is barley is unaffected and 10 is entire plot affected and Intensity=1-5, where 1 is barley standing upright and 5 is barley lying totally flat.

◇ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

Table 5. Summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 1998 harvest.*

Brand/Variety	Yield (Bu/A) (5)	Test Weight (Lb) (5)	Date Headed (Mar. 31+) (4)	Height (In) (4)	Lodging✣ (0.2-10) (5)	Scald (0-9)◇ (1)	Leaf Rust (0-9) (1)	Net Blotch (0-9) (1)
VA96-44-321	**108 +**	**47.9 +**	**18 +**	**36**	**2.8 -**	**4**	**3**	**5 +**
CALLAO	112 +	48.1 +	15 -	33 -	7.6 +	5	3	2 -
NOMINI	106	45.8	14 -	41 +	2.5 -	5	3	1 -
STARLING	109 +	44.8 -	19 +	40 +	3.7	6	2 -	4 +
WYSOR	96 -	45.4 -	20 +	41 +	3.9	5	5 +	3
Test Average (n=40)	103	46.3	17	36	4.3	5	3	3
L.S.D. (0.05)	5	0.8	1	1	1.2	2	1	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates performance significantly above or below the test average, respectively.

✣ Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is barley is unaffected and 10 is entire plot affected and Intensity=1-5, where 1 is barley standing upright and 5 is barley lying totally flat.

◇ The 0-9 ratings indicate relative disease intensity where 0=none and 9=total plant infection.

12

Table 6. Summary of performance of VA96-44-321 in the Virginia Tech Barley Test, 1997 Harvest.*

Brand/Variety	Yield (Bu/A) (5)	Test Weight (Lb) (5)	Date Headed (Mar 31+) (3)	Height (In) (3)	Lodging (0.2-10)✣ (3)	Barley Yellow Dwarf Virus (0-9)◇ (1)
VA96-44-321	**115**	**51.9**	**23 +**	**37 -**	**1.2**	**1 +**
CALLAO	122 +	53.7 +	20 -	36 -	5.0 +	0
NOMINI	114	49.3 -	21 -	43 +	1.9	1 +
STARLING	120	49.9 -	26 +	41 +	1.2	0
WYSOR	115	51.7	25 +	43 +	1.6	1 +
Test Average (n=40)	114	51.8	22	39	1.8	0
L.S.D. (0.05)	7	0.8	1	1	1.1	1

* The number in parentheses below column headings indicates the number of locations on which data are based. A plus or minus sign indicates performance significantly above or below the test average, respectively.

✣ Belgian Lodging Scale = Area X Intensity X 0.2. Area = 1-10, where 1 is barley is unaffected and 10 is entire plot affected and Intensity=1-5, where 1 is barley standing upright and 5 is barley lying totally flat.

◇ The 0-9 rating indicates relative disease intensity where 0=none and 9=total plant infection.

Table 7. Ranked yield averages of Price versus check varieties over all stations in the 1999-2000 Uniform Winter Barley Yield Nursery.

Selection or Variety	Yield Rank	Yield (bu/A)	GA Griffin	KY[1] Lexington	MD Queenstown	NC Kinston	NE Lincoln	OH Wooster	PA University Park	SC Clemson	SC Florence	TX Prosper	VA Blacksburg	VA Warsaw
Price	9	102.3	109.1	79.7	81.5	80.9	87.4	123.2	124.0	113.0	94.9	98.0	113.7	122.2
Callao	12	100.1	106.2	64.6	78.9	80.2	78.9	89.9	138.7	112.0	105.0	111.9	111.7	123.5
Wysor	17	93.0	107.9	74.4	84.1	90.2	82.3	77.6	123.0	94.6	70.9	82.0	116.4	112.6
Nomini	5	104.1	120.8	95.0	85.7	99.2	105.1	100.2	123.0	110.0	90.4	76.5	123.0	120.3
Perkins	23	81.1	85.1	64.2	85.8	74.5	87.5	91.6	94.0	74.0	69.2	85.7	68.1	93.3
VA97B-178	6	103.8	113.1	89.3	75.3	91.2	88.1	91.9	134.0	108.0	104.0	104.9	117.1	129.3
VA97B-176	2	112.9	130.2	75.4	85.8	110.8	97.8	109.3	141.0	118.0	116.0	115.5	123.9	130.6
VA97B-388	1	114.0	138.6	83.9	91.3	99.2	97.6	136.7	141.0	114.0	118.0	95.2	119.3	133.0
Average (N=25)		95.4	101.5	74.8	78.7	82.0	88.2	100.3	123.0	94.0	84.9	88.4	107.9	116.4
LSD (0.05)		8.9	24.2*	10.5*	21.2	15.2	18.8*	16.8*	17.0*	13.0	16.0	13.7	10.6*	10.3*
C.V. (%)		11.5	14.8	8.2	16.4	11.6	15.5	12.6	8.0	8.5	11.0	17.5	7.2	6.4

[1] Results of 2 reps.
* LSD (0.10)

Table 8. Performance of Price versus check varieties in the 1999-2000 Uniform Winter Barley Nursery: Averages over all stations for indicated characters.

Selection or Variety	Yield Rank	Yield (bu/A)	Test Weight (lbs/bu)	Heading Date (Julian)	Height (in.)	Lodging (0-9)[1]	Leaf Rust (0-9)	Powdery Mildew (0-9)
Price	9	102.3	47.0	106	32.8	1.1	2.5	0.5
Callao	12	100.1	47.8	105	32.3	4.4	2.0	0.0
Wysor	17	93.0	46.4	108	35.8	2.5	3.5	0.0
Nomini	5	104.1	46.5	106	37.9	1.8	2.5	0.0
Perkins	23	81.1	48.5	114	36.5	3.8	4.5	1.5
VA97B-178	6	103.8	47.0	107	32.2	2.7	3.0	0.5
VA97B-176	2	112.9	47.0	104	32.6	2.1	2.5	0.5
VA97B-388	1	114.0	47.0	108	34.9	1.3	4.0	0.5
Average (N=25)		95.4	47.5	109	35.5	2.9	3.7	1.3
LSD (0.05)		8.9	1.8	2.0	1.5	1.7	ns[2]	1.7
C.V. (%)		11.5	4.6	2.2	4.7	51.0	19.8	62.2
No. Locations		12	12	11	10	6	2	2

[1] All 0-9 ratings indicate relative disease/lodging severity: 0 = no disease/lodging present; 9 = total infestation of the plant by disease/completely lodged.

[2] Not significant.

6

Table 9. Ranked yield averages of Price versus check varieties over all stations in the 1998-99 Uniform Winter Barley Yield Nursery.

Selection or Variety	Yield Rank	Yield (bu/A)	GA Griffin	KY Lexington	MD Queenstown	NC Kinston	NE Lincoln	OH Wooster	PA University Park	SC Clemson	SC Florence	TX Prosper	VA Blacksburg	VA Warsaw
Price	1	102.1	90.3	124.4	127.8	97.0	67.5	152.8	115.0	70.6	51.8	56.4	123.0	149.0
Callao	6	97.1	99.4	106.5	110.7	85.0	62.8	130.0	115.0	58.9	54.7	69.0	126.0	147.0
Wysor	10	93.4	72.2	118.6	119.2	81.0	85.8	96.3	108.0	75.6	45.0	70.7	117.0	132.0
Nomini	3	99.6	60.6	118.8	128.8	98.0	73.1	137.3	111.0	93.7	41.5	68.8	122.0	142.0
Perkins	17	80.2	73.6	103.4	86.5	81.0	60.1	99.7	102.0	50.0	35.0	60.5	101.0	109.0
VA97B-178	2	100.1	90.0	109.2	117.1	90.0	45.7	137.8	130.0	69.7	40.9	80.2	135.0	156.0
Average (N=18)		92.9	77.1	114.7	111.4	84.0	64.3	124.5	105.0	68.0	43.9	64.4	123.0	133.0
LSD (0.05)		11.2	22.2	10.7	18.6	12.0	21.1	20.2	18.0	6.7	8.1	9.6	11.0	13.0
C.V. (%)		14.9	13.8	5.4	10.0	8.6	23.8	9.8			11.0	11.1		

Table 10. Performance of Price versus check varieties in the 1998-99 Uniform Winter Barley Nursery: Averages over all stations for indicated characters.

Selection or Variety	Yield Rank	Yield (bu/A)	Test Weight (lbs/bu)	Heading Date (Julian)	Height (in.)	Lodging (%)	Winter Survival (%)	Leaf Rust (0-9)[1]	BYDV (0-9)
Price	1	102.1	47.8	112	32.1	5.1	91.2	5.3	1.9
Callao	6	97.1	47.9	110	30.9	37.2	93.5	5.3	1.1
Wysor	10	93.4	46.0	114	35.9	14.6	94.4	7.3	1.5
Nomini	3	99.6	46.1	113	36.5	17.2	92.9	6.0	1.6
Perkins	17	80.2	48.7	119	36.0	13.5	99.5	4.0	2.5
VA97B-178	2	100.1	47.7	111	31.2	5.4	84.3	4.3	1.0
Average (N=18)		92.9	46.9	114	33.9	13.8	89.0	5.7	1.5
LSD (0.05)		11.2	3.0	9.4	1.8	14.7	21.1	1.9	ns[2]
C.V. (%)		14.9	8.1	2.1	6.4	93.0	16.7	19.8	
No. Locations		12	12	10	12	6	4	3	2

[1] All 0-9 ratings indicate relative disease severity: 0 = no disease present; 9 = total infestation of the plant by disease.

[2] Not significant.

Table 11. Ranked yield averages of Price versus check varieties over all stations in the 1997-98 Uniform Winter Barley Yield Nursery.

Selection or Variety	Yield Rank	Yield (bu/A)	GA Griffin	KY Lexington	MD Queenstown	NC Kinston	NE Lincoln	OH Wooster	PA University Park	SC Clemson	SC Florence	VA Blacksburg	VA Warsaw
Price	2	88.7	100.6	57.9	90.5	53.2	88.9	122.4	99.0	84.6	48.0	105.0	126.0
Wysor	18	72.5	41.1	29.8	83.5	38.9	79.7	92.5	93.0	75.7	50.8	99.0	113.0
Milton	20	68.7	61.7	26.1	76.1	35.3	72.7	80.4	104.0	59.6	39.4	90.0	110.0
Average (N=20)		82.2	74.7	47.4	84.8	51.3	86.9	111.9	102.7	77.9	48.9	98.0	119.0
LSD (0.05)		9.8	8.4		12.6	11.0	16.1	20.0	15.0	11.0	8.0	9.0	14.0
C.V. (%		14.2			9.0	14.5		10.8					

Table 12. Performance of Price versus check varieties in the 1997-98 Uniform Winter Barley Nursery: Averages over all stations for indicated characters.

Selection or Variety	Yield Rank	Yield (bu/A)	Test Weight (lbs/bu)	Heading Date (Julian)	Height (in.)	Lodging (%)	Winter Survival (%)
Price	2	88.7	46.0	114.1	31.5	21.9	92.3
Wysor	18	72.5	42.6	114.7	37.6	35.8	96.3
Milton	20	68.7	45.1	117.0	34.1	50.5	89.6
Average (N=20)		82.2	44.3	115.0	35.8	35.4	93.6
LSD (0.05)		9.8	1.4	2.0	1.5	19.4	6.6
C.V. (%		14.2	3.8	2.0	5.3	55.4	5.0
No. Locations		11	11	10	12	6	3

Table 13. Percent winter survival of Price versus check varieties at the various stations in the 1999-2000 Uniform Barley Winter Hardiness Nursery.

Selection or Variety	Rank According to Mean	Means Across Locations[1]	Canada Nairn	Turkey Eksehir	NE Lincoln	NE Mead	TX Dallas	Rank According to Mean	Means Across Locations[2]	KS Manhattan[3]
Price	8	88.0	90.0	50.0	100.0	100.0	100.0	3	89.1	100.0
Tenn. Winter	22	81.0	77.5	37.5	95.0	95.0	100.0	23	73.6	0.0
Trebi	29	63.0	12.5	7.5	100.0	95.0	100.0	29	57.3	0.0
Kearney	19	83.0	80.0	35.0	100.0	100.0	100.0	13	84.5	100.0
Kenosha (wheat)	9	87.8	99.0	55.0	100.0	85.0	100.0	4	88.9	100.0
Dicktoo	12	86.5	95.0	52.5	100.0	85.0	100.0	7	87.7	100.0
Kentucky 1	15	85.0	92.5	42.5	90.0	100.0	100.0	11	86.4	100.0
VA97B-178	6	90.0	80.0	70.0	100.0	100.0	100.0	2	90.9	100.0
VA97B-176	5	90.3	89.0	62.5	100.0	100.0	100.0	10	86.6	50.0
VA97B-388	1	93.5	97.5	70.0	100.0	100.0	100.0	12	85.5	5.0
Average (N=29)		83.6	76.3	46.3	99.1	96.9	99.1		80.0	43.5
LSD (0.05)		18.6	14.3	23.2	ns[4]	6.6	0.9			
C.V. (%)		11.7	14.5	38.3		5.3	0.7			

[1] Means obtained by MSTAT analysis excluding data from Manhattan location.

[2] Unweighted means calculated for the locations including Manhattan.

[3] Data from single replication of one meter row plots.

[4] Not significant.

Table 14. Percent winter survival of Price versus check varieties at the various stations in the 1998-99 Uniform Barley Winter Hardiness Nursery.

Selection or Variety	Rank According to Mean	Means Across Locations	GA	ID	KS	MD	NE	NE	PA	SD
			Griffin	Aberdeen	Hays	Keedysville	Lincoln	Mead	University Park	Brookings
Price	13	62.2	80	28	100	80	60	45	100	5
Tenn. Winter	24	45.1	80	49	83	70	10	5	65	0
Trebi	26	22.6	70	14	25	8	0	0	65	0
Kearney	2	90.0	80	98	100	93	100	90	100	60
Kenosha (wheat)	1	95.6	85	100	100	95	100	100	100	85
Dicktoo	5	86.9	83	53	100	95	100	85	100	80
Kentucky 1	6	83.8	70	83	98	88	100	75	98	60
VA97B-178	19	56.6	75	28	100	80	40	20	100	10
Average (N=26)		64.9	73	58	95	78	56	38	96	26
LSD (0.05)		19.0	ns[1]	50	15	12	48	25	11	19
C.V. (%)		21.6	12	42	8	8	42	33	5	35

[1] Not significant.

Table 15. Percent winter survival of Price versus check varieties at the various stations in the 1997-98 Uniform Barley Winter Hardiness Nursery.

Selection or Variety	Rank According to Mean	Means Across Locations	Canada	NE	NE	PA	SD	WI
			Nairn	Lincoln	Mead	University Park	Brookings	Madison
Price	19	64.4	94.0	95.0	35.0	100.0	20.0	42.5
Tenn. Winter	21	62.8	100.0	95.0	25.0	97.0	20.0	40.0
Trebi	23	48.9	100.0	80.0	35.0	60.0	10.0	8.5
Kearney	11	72.8	100.0	100.0	55.0	100.0	estd=29.5	52.5
Kenosha (wheat)	1	92.0	100.0	100.0	100.0	100.0	estd=53.0	99.0
Dicktoo	6	75.4	100.0	95.0	40.0	100.0	60.0	57.5
Kentucky 1	4	76.7	100.0	100.0	60.0	100.0	45.0	55.0
Average (N=23)		71.7	99.5	97.8	52.2	97.9	30.0	50.2
LSD (0.05)		14.2	2.2	ns[1]	31.1	6.7	ns	10.2
C.V. (%)		17.4	1.1	4.7	28.7	3.3	85.0	9.8

[1] Not significant.

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

Application is required in order to determine if a plant variety protection certificate is to be issued *(7 U.S.C. 2421)*. The information is held confidential until the certificate is issued *(7 U.S.C. 2426)*.

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Virginia Tech Intellectual Properties, Inc.	VA96-44-321	Price
4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP, and Country)*	**5. TELEPHONE** *(Include area code)*	**6. FAX** *(Include area code)*
1872 Pratt Drive, Suite 1625 Blacksburg, VA 24060	540-951-9374	540-951-5292
	7. PVPO NUMBER 200300132	

8. Does the applicant own all rights to the variety? Mark an "X" in the appropriate block. **If no, please explain.** ☑ YES ☐ NO

9. Is the applicant (individual or company) a U.S. national or a U.S. based company? **If no, give name of country.** ☑ YES ☐ NO

10. Is the applicant the original owner? ☐ YES ☑ NO **If no, please answer one of the following:**

a. If the original rights to variety were owned by individual(s), is (are) the original owner(s) a U.S. National(s)?
☐ YES ☐ NO **If no, give name of country**

b. If the original rights to variety were owned by a company(ies), is (are) the original owner(s) a U.S. based company?
☑ YES ☐ NO **If no, give name of country**

11. Additional explanation on ownership *(If needed, use the reverse for extra space)*:

Original owner Virginia Polytechnic Institute and State University assigned its ownership to current owner Virginia Tech Intellectual Properties, Inc. (See Attached)

PLEASE NOTE:

Plant variety protection can only be afforded to the owners (not licensees) who meet the following criteria:

1. If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.
2. If the rights to the variety are owned by the company which employed the original breeder(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.
3. If the applicant is an owner who is not the original owner, both the original owner and the applicant must meet one of the above criteria.

The original breeder/owner may be the individual or company who directed the final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definitions.

200300132

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY (hereinafter referred to as the "UNIVERSITY"), assigns to VIRGINIA TECH INTELLECTUAL PROPERTIES, INC. (hereinafter referred to as "VTIP") all rights, title and interest in and to the GERMPLASMS listed below as held by the UNIVERSITY:

VTIP 02.047	Price/VA96-44-321 Barley
VTIP 02.048	VA98W-593 Wheat
VTIP 02.049	VA97W-469 Wheat
VTIP 02.050	McCormick/VA98W-591

The UNIVERSITY, by its authorized agents, agrees that it will execute all necessary assignments as requested by VTIP, to facilitate the filing of patent applications and/or copyright registrations. It will render any reasonable assistance requested to aid in preparation of such applications and/or registrations.

The UNIVERSITY shall retain the right to make use of the GERMPLASM for internal research and other non-commercial purposes without cost to the UNIVERSITY.

All royalties, rents, payments, or any cash receipts from the sale, assignment, transfer, licensing or use of the GERMPLASM shall be the property of VTIP and shall be distributed according to the provisions of the Virginia Agricultural Experiment Station (VAES) Plant Germplasm Release Policy (PGRP).

Prior to the execution of this Assignment, the UNIVERSITY has not granted the right of license to make, use, or sell said GERMPLASM to anyone except to VTIP, nor has it otherwise encumbered its rights, title and interest in said GERMPLASM, and it will not execute any instrument in conflict with this Assignment.

IN WITNESS WHEREOF, the UNIVERSITY has caused this Assignment to be signed this 18 day of April, 2002.

VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

BY _____
MINNIS E. RIDENOUR
Chief Operating Officer

24

200300132

STATE OF VIRGINIA

COUNTY OF MONTGOMERY, to-wit:

The foregoing instrument was acknowledged before me this 18TH day of APRIL, 2002, by MINNIS E. RIDENOUR, CHIEF OPERATING OFFICER of Virginia Polytechnic Institute and State University, on behalf of said University.

Notary Public

My commission expires: 12/31/04